

Multifidelity Robust Aeroelastic Design, Phase I

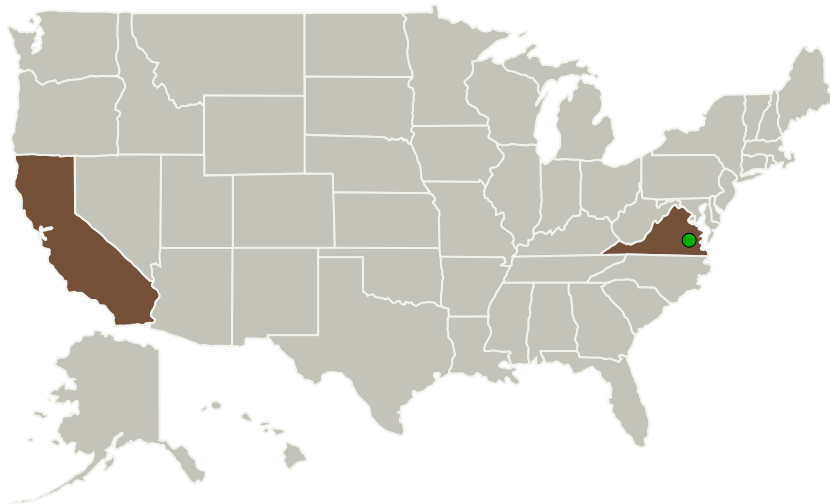
Completed Technology Project (2011 - 2011)



Project Introduction

Nielsen Engineering & Research (NEAR) proposes a new method to generate mathematical models of wind-tunnel models and flight vehicles for robust aeroelastic analysis and design. These models provide a unified description applicable to CFD steady and unsteady aerodynamics, reduced-order CFD approaches, flexible structures and active control systems, and can accommodate probabilistic aerodynamics and aeroelastics. NEAR's offering is based on probabilistic metamodels which are supported by analyses and data at all available levels of fidelity and which are dynamically updated based on multifidelity expected improvement concepts. The proposed software will help reduce the design and life-cycle cost of next-generation high-efficiency flight vehicle systems and revolutionary aerospace vehicles, and will help attain better aeroelastic designs, by providing a better understanding of how the design variables interact and affect each other under the influence of uncertainty, and by incorporating these interactions early in the design to reduce risk.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Nielsen Engineering & Research, Inc.	Lead Organization	Industry	Santa Clara, California
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

**February 2011:** Project Start**September 2011:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/138338>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nielsen Engineering & Research, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Patrick H Reisenthel

Co-Investigator:

Patrick Reisenthel

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Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.3 Aeroelasticity

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System